FLUKE®

101

Digital Multimeter

Users Manual

July 2013, Rev. 2, 12/22

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

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Introduction

The Fluke 101 Multimeter (the Product) is a 6000-count instrument. The Product is battery powered with a digital display.

Contact Fluke

Fluke Corporation operates worldwide. For local contact information, go to our website: www.fluke.com

To register your product, view, print, or download the latest manual or manual supplement, go to our website.

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Safety Information

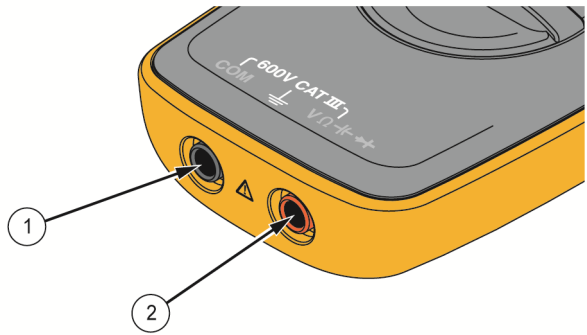
The Fluke 101 is rated to IEC 61010-1 CAT III 600 V measurement category. See *General Specifications*.

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that could cause damage to the Product or the equipment under test.

General Safety Information in the printed Safety Information document that ships with the Product. It can also be found online at www.fluke.com. More specific safety information is listed in this manual where applicable.

Instrument Overview

Terminals



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Item	Description
①	Common (return) terminal for all measurements.
②	Input terminal for all measurements.

Display

Figure 1 and Table 1 show the items on the Product display.

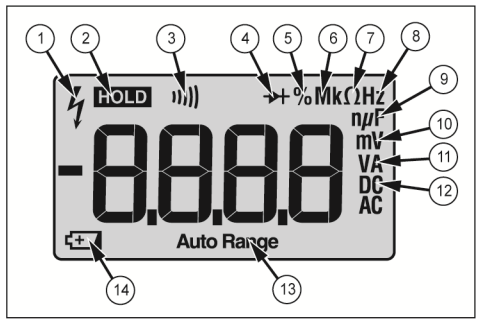

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Figure 1. Display

Table 1. Display

Item	Description	Item	Description
①	High voltage	⑧	Frequency is selected
②	Display Hold is enabled	⑨	Farads
③	Continuity selected	⑩	Millivolts
④	Diode test is selected	⑪	Amps or volts
⑤	Duty Cycle is selected	⑫	Dc or ac voltage or current
⑥	Decimal prefix	⑬	Auto Range mode is enabled
⑦	Ohms is selected	⑭	Battery is low and should be changed

Rotary Switch

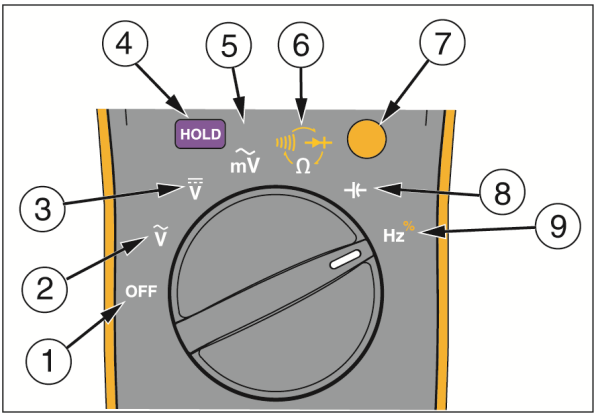

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Figure 2. Rotary Switch

Table 2. Rotary Switch Functions

Number	Description	Number	Description
①	Power down the Product.	⑥	Ohms. Push shift for continuity and diode test.
②	AC Volts	⑦	Shift. Push for yellow functions.
③	DC Volts	⑧	Capacitance
④	Freeze the display.	⑨	Frequency. Push shift for duty cycle.
⑤	AC millivolts		

Auto Power Off

The Product automatically powers off after 20 minutes of inactivity.

To restart the Product, turn the rotary switch back to the **OFF** position and then to a necessary position.

To disable the Auto Power Off function, hold down the **YELLOW** button when turning on the Product, until PoFF shows on the display.

Measurements

Data Hold

⚠⚠ Warning

To prevent possible electrical shock, fire or personal injury, do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.

To hold the present reading, push HOLD. Push HOLD again to resume normal operation.

Measure AC and DC Voltage

To measure ac and dc voltage:

1. Choose ac or dc by turning the rotary switch to $\tilde{V}$, $\overline{\tilde{V}}$, or $\widetilde{mV}$.
2. Connect the red test lead to the **V Ω ⊣⊢ ⊣◂** terminal and the black test lead to the **COM** terminal.
3. Measure the voltage by touching the probes to the correct test points of the circuit.
4. Read the measured voltage on the display.

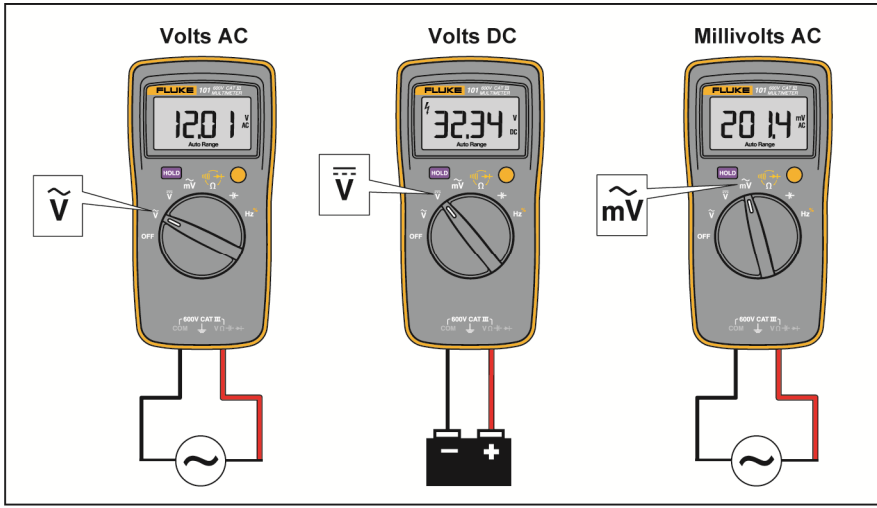

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Figure 3. Measure AC and DC Voltage

Measure Resistance

1. Turn the rotary switch to Ω. Make sure power is disconnected from the circuit to be measured.
2. Connect the red test lead to the **V Ω** terminal and the black test lead to the **COM** terminal.
3. Measure the resistance by touching the probes to the desired test points of the circuit.
4. Read the measured resistance on the display.

Test for Continuity

With the resistance mode selected, push the **YELLOW** button once to activate the continuity mode. If the resistance is <70 Ω, the beeper sounds continuously, designating a short circuit. If the Product reads OL, the circuit is open.

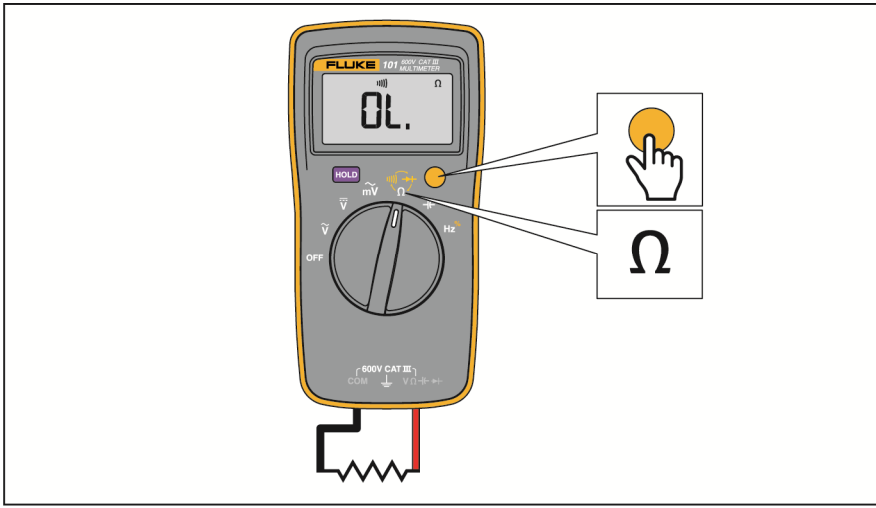

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Figure 4. Measure Resistance/Continuity

Test Diodes

1. Turn the rotary switch to .
2. Push the **YELLOW** button twice to activate the diode test mode.
3. Connect the red test lead to the **V Ω** terminal and the black test lead to the **COM** terminal.
4. Connect the red probe to the anode and the black test lead to the cathode of the diode being tested.
5. Read the forward bias voltage value on the display.
6. If the polarity of the test leads is reversed with diode polarity, the display reading shows OL. This can be used to distinguish the anode and cathode sides of a diode.

Measure Capacitance

1. Turn the rotary switch to .
2. Connect the red test lead to the **V Ω** terminal and the black test lead to the **COM** terminal.
3. Touch the probes to the capacitor leads.
4. Let the reading stabilize (up to 18 seconds).
5. Read the capacitance value on the display.

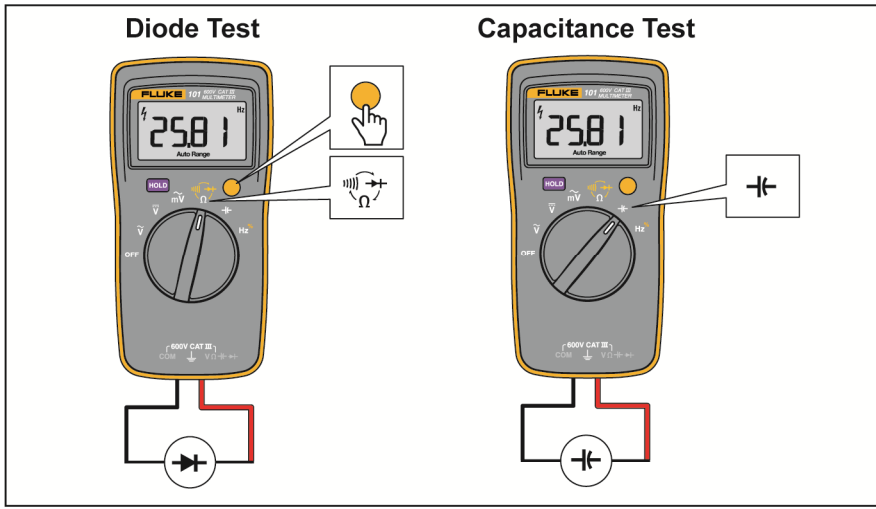

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Figure 5. Diode and Capacitance Tests

Measure Frequency and Duty Cycle

To measure frequency:

1. Turn the rotary switch to **Hz%**.
2. Connect the red test lead to the **VΩ⊣⊢→⊢** terminal and the black test lead to **COM** terminal.
3. Measure frequency by touching the probes to the correct test points of the circuit.
4. Read the frequency on the display.

To measure duty cycle:

1. Turn the rotary switch to **Hz%**.
2. Push the **YELLOW** button to switch to the duty cycle function.
3. Connect the red test lead to the **VΩ⊣⊢→⊢** terminal and the black test lead to **COM** terminal.
4. Measure duty cycle by touching the probes to the correct test points of the circuit.
5. Read the percent of duty cycle on the display.

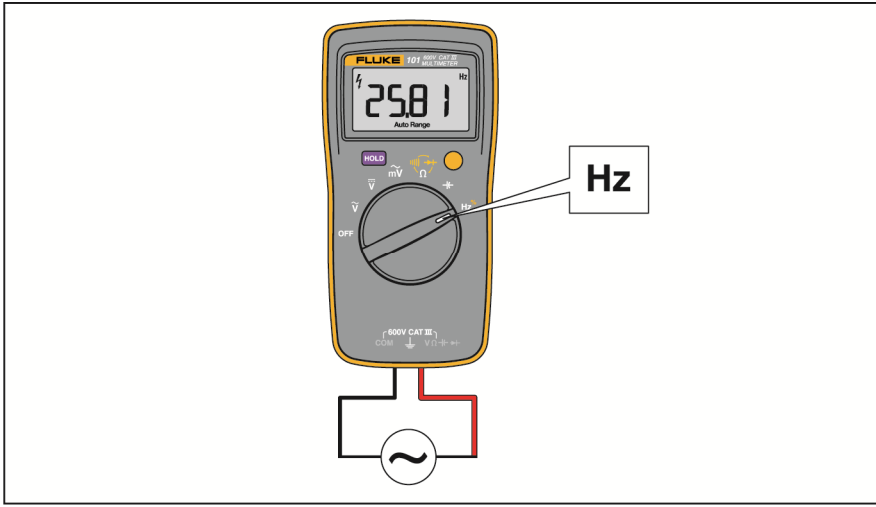

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Figure 6. Measure Frequency/Duty Cycle

Maintenance

Beyond replacing batteries, do not attempt to repair or service the Product unless you are qualified to do so and have the relevant calibration, performance test, and service instructions. The recommended calibration cycle is 12 months.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury:

- **Remove the input signals before you clean the Product.**
- **Use only specified replacement parts.**
- **Have an approved technician repair the Product.**

For safe operation and maintenance of the Product, repair the Product before use if the batteries leak.

General Maintenance

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings.

Replace Batteries

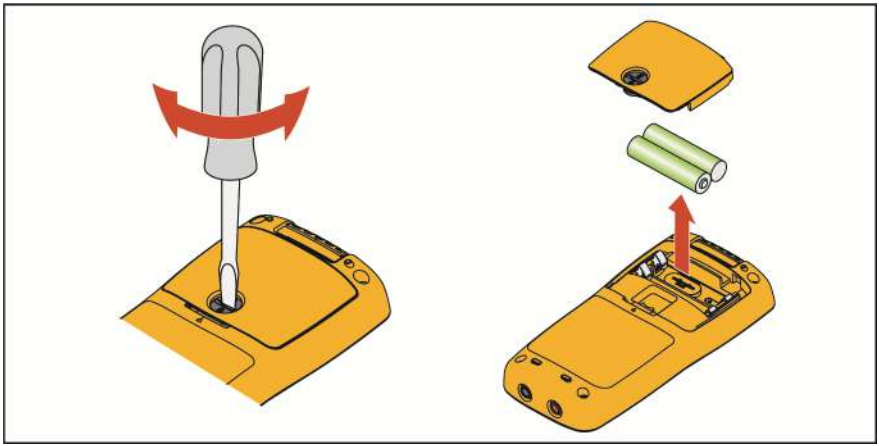

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Figure 7. Replace Batteries

Service and Parts

If the Product fails, first check the batteries. Then, review this manual to make sure you are operating the Product correctly.

Replacement parts are:

Item	Fluke Part Number
Batteries	2838018
Battery door	4319659
Test leads TL175	4306653
Screws	4320657

General Specifications

Maximum voltage between any terminal and Earth Ground ..... 600 V
Display (LCD) ..... 6000 counts, update rate 3/sec
Battery Type ..... 2 AAA, IEC LR03
Battery Life ..... 200 hours minimum
Temperature
Operating ..... 0 °C to 40 °C
Storage ..... -30 °C to 60 °C
Relative Humidity
Operating Humidity ..... Non-condensing when <10 °C;
≤90 % at 10 °C to 30 °C;
≤75 % at 30 °C to 40 °C (Non-condensing)
Operating Humidity, 40 MΩ Range ..... ≤80 % at 10 °C to 30 °C;
≤70 % at 30 °C to 40 °C (Non-condensing)

Altitude
Operating..... 2000 m
Storage..... 12,000 m
Temperature Coefficient ..... 0.1 X (specified accuracy) / °C (<18 °C or >28 °C)
Size (HxWxL) ..... 130 mm x 65 mm x 27 mm
Weight ..... 160 g
IP Rating..... IEC 60529: IP 40
Safety ..... IEC 61010-1: Pollution Degree 2,
IEC 61010-2-033: CAT III 600 V

Electromagnetic Compatibility (EMC)
International..... IEC 61326-1: Portable, IEC 61326-2-2
CISPR 11: Group 1, Class A

Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.

Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances.

Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object. The equipment may not meet the immunity requirements of this standard when test leads and/or test probes are connected.

Korea (KCC)..... Class A Equipment (Industrial Broadcasting & Communication Equipment)

Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.

USA (FCC) ..... 47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.

Accuracy Specifications

Accuracy is specified for 1 year after calibration, at operating temperature range of 18 °C to 28 °C, relative humidity at 0 % to 90 %. Accuracy specifications take the form of: ±([% of Reading] + [Number of Least Significant Digits])

Function	Range	Resolution	Accuracy
AC Volts (40 Hz to 500 Hz) [1] $\widetilde{V}$	6.000 V 60.00 V 600.0 V	0.001 V 0.01 V 0.1 V	1.0 % + 3
DC Volts $\overline{\overline{V}}$	6.000 V 60.00 V 600.0 V	0.001 V 0.01 V 0.1 V	0.5 % + 3
AC Millivolts (40 Hz to 500 Hz) [1] $\widetilde{mV}$	600.0 mV	0.1 mV	3.0 % + 3
Diode Test [2] ⇻	2.000 V	0.001 V	10 %

[1] All AC, Hz, and duty cycle are specified from 1 % to 100 % of range. Inputs below 1 % of range are not specified.

[2] Typically, open circuit test voltage is 2.0 V and short circuit current is <0.6 mA.

Function	Overload Protection	Input Impedance (Nominal)	Common Mode Rejection Ratio	Normal Mode Rejection Ratio
AC Volts	600 V [1]	>10 MΩ <100 pF	>60 dB at dc, 50 Hz or 60 Hz	–
AC Millivolts	600 mV	>1 M, <100 pF	>80 dB at dc, 50 Hz or 60 Hz	–
DC Volts	600 V [1]	>10 MΩ <100 pF	>100 dB at 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz

[1] 6×10^5 V Hz Max.

Function	Range	Resolution	Accuracy
Resistance Ω	400.0 Ω 4.000 kΩ 40.00 kΩ 400.0 kΩ 4.000 MΩ 40.00 MΩ	0.1 Ω 0.001 kΩ 0.01 kΩ 0.1 kΩ 0.001 MΩ 0.01 MΩ	0.5 % + 3 0.5 % + 2 0.5 % + 2 0.5 % + 2 0.5 % + 2 1.5 % + 3
Capacitance [1] ⊣⊢	50.00 nF 500.0 nF 5.000 µF 50.00 µF 500.0 µF 1000 µF	0.01 nF 0.1 nF 0.001 µF 0.01 µF 0.1 µF 1 µF	2 % + 5 2 % + 5 5 % + 5 5 % + 5 5 % + 5 5 % + 5
Frequency [2] **Hz** (10 Hz – 100 kHz)	50.00 Hz 500.0 Hz 5.000 kHz 50.00 kHz 100.0 kHz	0.01 Hz 0.1 Hz 0.001 kHz 0.01 kHz 0.1 kHz	0.1 % + 3
Duty Cycle [2]	1 % to 99 %	0.1 %	1 % typical [3]

[1] Specifications do not include errors due to test lead capacitance and capacitance floor (may be up to 1.5 nF in the 50 nF range).
[2] All AC, Hz, and duty cycle are specified from 1 % to 100 % of range. Inputs below 1 % of range are not specified.
[3] Typical means when the frequency is at 50 Hz or 60 Hz and the duty cycle is between 10 % and 90 %.